Please amend claim 48 as follows:

48. (Twice amended) A method for detecting contours on a specimen surface, comprising:

applying light energy to said specimen surface, said light application comprising generating light using a light generating device and receiving light from said light generating device and imparting light toward said specimen surface; and

detecting surface variations having relative surface height variations of less than approximately 1000 nanometers and surface contours over areas larger than particles and scratches, said detecting comprising transmitting light energy received from said specimen surface, receiving a retro beam deflected therefrom and transmitting said retro beam toward a [predetermined target] multi-element sensing device comprising a plurality of linearly oriented sensing elements such that said retro beam is received by at least three of said sensing elements.

REMARKS

Claims 1-17, 24, 26-31, 37-48, 50, and 61-63 are pending. No new matter has been introduced. Applicants respectfully request an action on the merits.

In the Final Office Action dated August 25, 2000, the Examiner rejected claims 1-17, 24, 26-31, 37-48, 50 and 61-63 (i.e., all pending claims). The Examiner objected to Applicants' previous amendment of the specification by the amendment of June 8, 2000 as containing new matter. (Final Office Action, ¶ 1.) The Examiner also objected to the specification under 35 U.S.C. § 112 for allegedly failing to clearly disclose the dark field collection arrangement and for lacking disclosure as to the Nomarski DIC sensor. (Final Office Action, ¶ 2.) Based upon these objections, the Examiner rejected claims 4, 8-10, 42, 43, 45, and 46 under 35 U.S.C. § 112, first

paragraph, as "containing subject matter that was not described in the specification in such a way as to enable one skilled in the art . . . to make and/or use the invention." (Final Office Action, ¶ 3.)

The Examiner also rejected claims 1, 6, 11, 13, 16, 17, 37, 41, 44, 47, 62 and 63 under 35 U.S.C. § 103(a) as being obvious in view of U.S. Patent No. 3,885,875 (the "Rosenfeld et al. reference") and further in view of U.S. Patent No. 5,812,266 (the "Hercher reference"). (Final Office Action, ¶ 5.) Finally, the Examiner rejected claims 2-3, 5, 7, 12, 14-15, 24, 26-31, 38-40, and 48-50 under 35 U.S.C. § 103(a) as being obvious in view of U.S. Patent No. 5,798,829 (the "Vaez-Iravani reference") further in view of the Rosenfeld reference.

OBJECTION TO DESCRIPTION OF "DARKFIELD COLLECTING ARRANGEMENT" AND REJECTION OF CLAIM 4

The Examiner rejected claim 4 under 35 U.S.C. § 112, first paragraph, as indefinite based on the language "wherein said optical element arrangement further comprises a dark field collection arrangement."

On a related note, the Examiner objected to Applicants' amendment of the specification in the Amendment dated June 8, 2000 as adding new matter. By that amendment, the following language was inserted into the specification in place of the language at page 9, lines 10-16:

> While the system disclosed herein illustrates a normal application of a beam to the specimen 110, it is to be understood that the teachings of the current invention contemplate application of a beam to a specimen in non-normal or oblique angles. As used herein, the term "retro" or "retro beam" is intended to cover both normal and non-normal reflection of the beam from the specimen, and therefore may include darkfield or brightfield techniques.
>
> In the mechanization of Fig. 1, after the split beam contacts the specimen surface, the light scattered at a narrow angle to the incident beam from surface defects is collected in the Dark Field Narrow (DFN) channel, while most of the light scattered at larger angles by the surface defects is collected in the Dark Field Wide (DFW) channel. The remainder of the beam is specularly reflected back through the components outlined

above. As two beams illuminate the wafer surface, two beams are returned through the elements up to the birefringent prism, which combines the two retro beams into a single beam. The single beam is returned through the remaining elements. This mechanization therefore forms a darkfield collection arrangement in the embodiment shown."

The language added to the specification by the previous Amendment is in fact a combination of virtually verbatim language already present in the original specification at page 9, lines 10-16 and at page 4, lines 3-13. Applicants again respectfully submit that the previous amendment to the specification added no new matter to the specification, but instead simply reorganized material already present in the original application. Accordingly, Applicants request that the Examiner reconsider the grounds for objecting to the previous amendment.

The inserted language describes the use of darkfield illumination according to the present invention in sufficient detail for a person of ordinary skill in the art to make and use the invention. Applicants respectfully submit that claim 4 is not indefinite and request that the Examiner reconsider the rejection of claim 4 under 35 U.S.C. § 112, first paragraph.

OBJECTION TO DESCRIPTION OF "NOMARSKI DIC SENSOR" AND REJECTION OF CLAIMS 8-10, 42, 43, 45, AND 46

For the Nomarski DIC sensor, claims 8-10, 42, 43, 45, and 46 rejected by the Examiner generally include phrases such as "optical element arrangement comprises a Nomarski Differential Interference Contrast sensor" (claim 8) and the Nomarski DIC sensor "divides light received in a single beam into a plurality of beams" (claim 9). These statements are supported in the specification by birefringent or DIC prism 106, explained in detail at page 10, ll. 10-29 of the specification as follows:

> The current system provides the ability to perform a deviation measurement using the bright field scanning Nomarski

> Differential Interference Contrast sensor 106. The bright field scanning Nomarski Differential Interference Contrast sensor 106 splits the beam into two separate beams which are applied to the surface of the specimen 110 as shown in FIGs. 1 and 2 and outlined above. The specimen 110 is rotated about a vertical axis and concurrently translated horizontally during a typical scan while the beam remains stationary. As a result of the scanning process, the Nomarski DIC sensor 106 senses occurrences in a predetermined direction, such as in a tangential direction from the center of the specimen, while the optical lever created by the optics senses occurrences in an orthogonal direction to that of the Nomarski DIC sensor 106. While the system may use the Nomarski DIC sensor 106 to measure in the tangential direction and the optical lever to measure in the radial direction, it is to be understood that other orientations are possible but it is preferred that the Nomarski DIC sensor and optical lever are always orthogonal to one another.

The Examiner in his rejection discusses uncertainty regarding the function of beamsplitter 105. As discussed in the specification and from an examination of FIGs. 1 and 2, the beamsplitters 105 and 118 are included in the system and either split the retro beam and apply the retro beam to the array 117 or simply allow the retro beam to pass through. In FIG. 1, as shown therein and discussed in the specification, the beamsplitter 105 allows the retro beam to pass "through" and thus does not divert or otherwise alter the retro beam (see, e.g., Specification, p. 8, l. 29 – p. 9, l. 1). However, in FIG. 2, the beamsplitter 105 redirects and applies said beam to the array 117.

Applicants respectfully submit that FIGs. 1 and 2, including Nomarski DIC sensor 106, and the beamsplitter 105 in combination with the wording of the specifcation provide support for the limitations included in claims 8-10, 42, 43, 45, and 46. Should the Examiner still consider the rejection based on the Nomarski DIC prism meritorious based on these sections, Applicants respectfully requests further clarification of the alleged deficiencies in the relevant claim(s).

INDEPENDENT CLAIMS 1 AND 37 AND DEPENDENT CLAIMS 2-17, 38-47, 62 AND 63

The Examiner rejected independent claims 1 and 37 and dependent claims 6, 11, 13, 16, 17, 41, 44, 47, 62 and 63 under 35 U.S.C. § 103 based on Rosenfeld et al. in view of Hercher.

Neither the Rosenfeld et al. reference nor the Hercher reference discloses a "plurality of weighting elements corresponding to each of said plurality of sensing elements" wherein each of said weighting elements alters a characteristic of said electrical output for said corresponding sensing element based on a distance of said sensing element from a predetermined point on said multi-element sensing device." The Rosenfeld et al. reference discloses a sensing device consisting of two sensing elements, i.e., a bi-cell detector. [Rosenfeld et al. reference, col. 5, lines 48-53.] The photoelectric current output by each cell is proportional to the distance between the light spot and a zero position. [Rosenfeld et al. reference, col. 5, lines 53-57.] The difference between the current output by each cell is normalized by the sum of their current outputs to determine the position of the light spot and minimize the effect of variations in spot intensity on current outputs. [Rosenfeld et al. reference, col. 5, line 62 – col 6, line 8.] Therefore, according to the Rosenfeld et al. reference, the current output of each cell is only multiplied by the inverse of the sum of the cell current outputs, a value that depends only upon the area and intensity of the light spot rather than the distance of the light spot from a particular position.

While the distance between the light spot and the zero point may affect the current output of each cell, the distance between the sensing element and a point on the sensing device does not affect how the current output of the a cell is used to calculate the position of a light spot according to the Rosenfeld et al. reference. Therefore, the Rosenfeld et al. reference does not describe, disclose, teach or suggest how to alter the electrical output of a sensing element "based on a distance of said sensing element from a predetermined point on said muti-element sensing device."

The Hercher reference does not compensate for the deficiencies of the Rosenfeld et al.

reference. The Examiner stated that the Hercher reference "shows a system in which, like that of Rosenfeld et al, there is a position sensitive detector, and, like Rosenfeld et al, a ration [sic] is formed (compare column 6, lines 5-8 of Rosenfeld et al to column 7, lines 10-11 of Hercher). Hercher then states that the detector may be, among other known detectors, 'a CD [sic] array'. (column 7, line 13)."

Applicants submit that it is improper to combine the Hercher reference with the Rosenfeld et al. reference, since the two references are directed toward two inapposite problems to be solved. While the Rosenfeld et al. reference relates to the detection of surface defects of unknown shapes and sizes, the Hercher reference is directed to the art of positional control detection. The Hercher reference discloses a system that detects surface features having a radius of curvature that preferably falls within the range of 0.5-5.0 mm." [Hercher reference, col. 7, lines 30-32.] The width of the light spot contemplated for use with the disclosed position sensitive detectors is "within the range of 50 μm - 100 μm." [Hercher reference, col. 7, lines 22-23.] In contrast, embodiments of the present invention are directed to systems for inspecting a specimen to detect surface defects that may be on the order of 100 nanometers. [p. 16, lines 17-22.] A person of ordinary skill in the art would not be motivated to combine the teachings of the Hercher reference with those of the Rosenfeld et al. reference for such applications.

Moreover, the Hercher reference discloses no specific information as to the use of output from a CCD array in the current context. The only means for calculating position of a light spot disclosed in the Hercher reference is the same as that disclosed in the Rosenfeld et al. reference with respect to embodiments using a bi-cell detector. [Hercher reference, col. 5, line 4 - col. 7, line 11.] Accordingly, the Hercher reference does not disclose, describe, teach or suggest how to alter the electrical output of a sensing element "based on a distance of said sensing element from

a predetermined point on said muti-element sensing device."

Applicants also respectfully note that the Examiner cited U.S. Patent No. 3,866,038 (the "Korth reference") and U.S. Patent No. 5,015,096 (the "Kowalski et al. reference") as describing the use of "a detector array" and "a multiple diode array" respectively. (Final Office Action, ¶ 7.) Neither of these references was cited as a whole or partial basis for rejecting any claims. However, neither reference discloses, describes, teaches or suggests "altering a characteristic of said electrical output by applying a corresponding weighting element to each of said plurality of sensing elements based on a distance of said sensing element from a predetermined point on said multi-element sensing device." Therefore, Applicants believe that the combination of these references with the Rosenfeld et al. and the Hercher references still would not render unpatentable claims 1 or 37.

Based on the deficiencies of the Rosenfeld et al. and Hercher references noted above, Applicants submit that independent claims 1 and 37, as amended, distinguish over the cited art. Furthermore, claims 2-17 and 62, which depend either directly or indirectly from claim 1, and claims 38-47 and 63, which depend either directly or indirectly from claim 37, distinguish over the cited references for the same reason. Accordingly, Applicants respectfully request that claims 1-17 and 37-50 be allowed.

INDEPENDENT CLAIM 24 AND CLAIMS DEPENDENT THEREON

The Examiner rejected claim 24 and claims 26-31 under 35 U.S.C. § 103(a) as obvious in view of the Vaez-Iravani reference and further in view of the Rosenfeld et al. reference. The Examiner stated that "Vaez-Iravani shows that it is known to place an optical isolator in a system generally as claimed. Rosenfeld et al teaches that the precision of measurement can be adjusted

(column 4, lines 59-63), choosing an appropriate degree of accuracy would be within the skill of those in the art."

Neither the Vaez-Iravani reference not the Rosenfeld et al. reference disclose transmitting said retro beam "toward a multi-element sensing device comprising a plurality of linearly oriented sensing elements such that said retro beam is received by at least three of said sensing elements." Applicants respectfully submit that this aspect of transmission of the retro beam is neither disclosed nor suggested by the cited references and that independent claims 24 and 48, as amended, include limitations that distinguish them over the art cited.

Accordingly, Applicants submit that the invention of independent claims 24 and 48 distinguishes over the Vaez-Iravani and Rosenfeld et al. references. Moreover, for the same reasons, dependent claims 26-31, which depend either directly or indirectly from claim 24, and dependent claims 50 and 61, which depend directly from claim 48, also distinguish over the cited references. Applicants respectfully request that claims 24, 26-31, 48, 50 and 61 be allowed.

CONCLUSION

In view of the foregoing, it is respectfully submitted that all claims of the present application are in condition for allowance. Re-examination and reconsideration of claims 1-17, 24-31, 37-50, and 61-63, as amended, are respectfully requested and allowance of all claims at an early date is solicited.

If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is requested to call either of the undersigned attorneys at the Los Angeles telephone number (213) 488-7100 to discuss the steps necessary for placing the application in condition for allowance should the Examiner believe that such a telephone conference would advance prosecution of the application.

Applicant hereby authorizes the Patent Office to charge any deficiencies or credit any overpayment to Deposit Account 16-1805.

Respectfully submitted,

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Date: December 26, 2000

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